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New loosening wool machines

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ABSTRACT

The types and principles of loosening machines operating at enterprises of primary wool processing are analyzed. Defects of opening machines and their effect on the product are explained. The design and operating principle of a new spraying machine for preparing high-quality products are proposed.

Key words: raw wool, fiber, loosening process, pollution, cleaning.

1. Introduction.

Currently, there is a development in the field of textiles and processing of woolen raw materials. The technology for processing raw wool was developed even before our era, and this continues to the present time. There are two main factors in the processing of wool raw materials: technology and quality wool raw materials. From the past centuries to the present, the improvement of wool processing technology and the improvement of the quality of wool continue.

For the production of industrial wool raw materials, scientists have developed a breed of sheep with soft wool. At the same time, wool processing enterprises are being modernized and improved. Wool varieties around the world vary according to the climate of the region and the breed of sheep wool. The main indicators of wool appear in its fineness [1].

The primary processing process includes acceptance of wool in terms of quantity and quality, sorting and washing.

All natural sheep's wool is divided into fine, semi-fine, semi-coarse and coarse. To accept wool for quality, a control classification is performed with the selection of wool samples for laboratory tests. Not all wool is subjected to control classification, but only 10-20%, the results obtained apply to the entire incoming batch of raw materials.

2. Theoretical research.

The two-drum scraper 2BT-150-Sh differs from the previously produced 2BT machines in its greater working width and productivity.

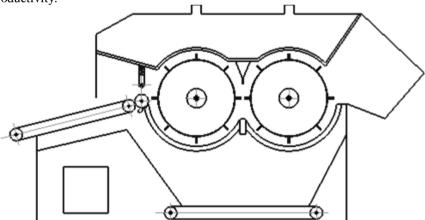


Figure: 1. Scutching machine 2BT-150-Sh

This loosening machine is morally outdated, therefore, it has disadvantages, including: mechanical action of the pegs on the wool fiber.

The design of the various tuning pegs and the operating efficiency are as follows.

3. Experimental research.

Scattering machines of various designs have drums with 4, 8, 12, 16 and 24 rows of pegs. The completeness of loosening is characterized by the number of blows of the pegs, which 1 kg of unwashed wool receives when passing through a scutching machine:

$$P_{\kappa} = (\kappa_1 m_1 n_{\delta_1} + \kappa_2 m_2 n_{\delta_2}) / \upsilon_{\Pi.p} bq$$

where P_{κ} - completeness of loosening (number of blows of pegs); κ_{I} , κ_{2} - the number of rows of tuners on the drum; m_{I} , m_{2} - number of pegs in one row; n_{6I} , n_{62} - drum rotation frequency, \mathcal{C}^{-1} ; $\mathcal{U}_{\Pi.p}$ - speed of the feeding grid, M/C; b; is the width of the feeding grid, M/C; D/C is the mass of wool flooring per 1 D/C of the feeding grid [3].

An advanced loosening machine for separating the maximum amount of wool clumps and for cleaning

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dirt, separates the wool raw material as much as possible into clumps, which ensures an effective cleaning.

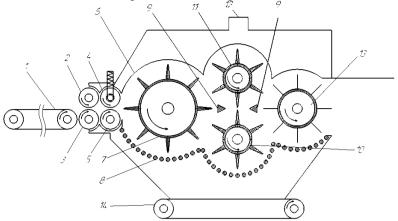


Figure: 2 New opening machine

1-feed tape; 2, 5-grooved rollers; 3-smooth roller; 4- Clamping grooved roller; 6-mesh surface; 7,10,11 - pedestal drums; 8-grate; 9-perforated partition; 12-pipe that removes dusty air; 13-slat drum; 14-tape removing dirt

The proposed machine works as follows. The raw material is transferred to the feeding belt 1. The feeding rollers 2,3,4,5 provide a uniform supply of wool to the cleaning drums. Under the influence of the peg drum 7 and the grate 8, the wool is loosened and cleaned of impurities. The raw material is additionally loosened with the help of peg drums 10.11. Then it leaves the machine through the drum. Dust is sucked out using pipe 12.

The trash impurities through the grate 8 fall onto the belt 14. The belt removes the trash impurities from the machine.

There are other parts of this machine that are different from other openers, the machine is designed with two perforated baffles -9. The perforated partition has three corners, when you hit their edges, the shreds of wool are cleaned very efficiently.

The bell drums 7,10,11 carry out the basic opening processes. The rotation frequency of the drum heads (7 < 10 < 11) is different.

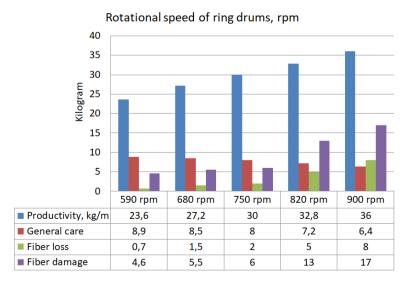
4. Analysis of the results.

The purpose of this machine is to improve efficiency and productivity. For non-destruction of the natural properties of raw materials, mechanical forces were studied.

When carrying out the experiment according to the state standard, the raw materials were selected as semi-wool of the 2nd class, 1st grade.

In order to improve the performance of the machine, research has been carried out on 5 types of tuning pegs speeds. When analyzing the results, the influence of the efficiency of the machine on increasing productivity was determined. The optimal parameters of the tuning drum speed have been determined.

The research process was carried out with four replicates. The results are shown in 1-diagram.



The purpose of this design of the wool processing machine is to improve the quality of the wool.

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Currently, the production for the primary processing of wool has obsolete equipment with large dimensions.

Conclution. The offered characteristics of the machine are high performance, structural structure, product impact, low energy consumption, energy efficiency and effective loosening. In this machine, the optimal variant of the parts is selected, which have a positive effect on the natural characteristics of the product.

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